

109TH CONGRESS
2D SESSION

H. R. 5634

To authorize research, development, demonstration, and commercial application activities for advanced energy technologies.

IN THE HOUSE OF REPRESENTATIVES

JUNE 16, 2006

Mrs. BIGGERT (for herself, Mr. BOEHLERT, Mr. CALVERT, and Mr. EHLERS) introduced the following bill; which was referred to the Committee on Science

A BILL

To authorize research, development, demonstration, and commercial application activities for advanced energy technologies.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Advanced Energy Ini-
5 tiative Act of 2006”.

6 **SEC. 2. DEFINITIONS.**

7 For the purposes of this Act—

8 (1) the term “biomass” has the meaning given
9 that term in section 932(a)(1) of the Energy Policy
10 Act of 2005 (42 U.S.C. 16232(a)(1));

1 (2) the term “cellulosic feedstock” has the
2 meaning given the term “lignocellulosic feedstock”
3 in section 932(a)(2) of the Energy Policy Act of
4 2005 (42 U.S.C. 16232(a)(2));

5 (3) the term “engineering-scale” means the
6 minimum size required to predict with confidence all
7 physical processes controlling the performance of a
8 full-scale industrial facility;

9 (4) the term “National Laboratory” has the
10 meaning given the term “nonmilitary energy labora-
11 tory” in section 903(3) of the Energy Policy Act of
12 2005 (42 U.S.C. 16182(3));

13 (5) the term “plug-in hybrid motor vehicle”
14 means a motor vehicle that—

15 (A) can operate on either liquid combus-
16 tible fuel or electric power provided by a re-
17 chargeable battery that can be recharged using
18 offboard sources of electric power;

19 (B) utilizes regenerative power capture
20 technology to recover energy expended in brak-
21 ing the vehicle for use in recharging the bat-
22 tery; and

23 (C) can operate solely on electric power for
24 a minimum of 20 miles under city driving con-
25 ditions; and

1 (6) the term “Secretary” means the Secretary of
2 Energy.

3 **SEC. 3. FUTUREGEN.**

4 (a) IN GENERAL.—The Secretary shall carry out a
5 project to demonstrate the feasibility of the commercial
6 application of advanced clean coal energy technology, in-
7 cluding carbon capture and geological sequestration, for
8 electricity generation.

9 (b) REQUIREMENTS.—The Secretary shall design the
10 project to ensure that—

11 (1) the project is operating by 2012;

12 (2) the project shall be able—

13 (A) to achieve at least a 99 percent reduc-
14 tion in sulfur dioxide emissions;

15 (B) to emit no more than 0.05 pounds of
16 nitrogen oxide emissions per million British
17 thermal units of energy produced by the
18 project;

19 (C) to achieve at least a 90 percent reduc-
20 tion in mercury emissions;

21 (D) to emit no more than 0.005 of total
22 particulate emissions in the flue gas per million
23 British thermal units of energy produced by the
24 project; and

1 (E) to achieve at least a 90 percent reduc-
2 tion in carbon dioxide emissions; and

3 (3) the project demonstrates the feasibility of
4 electricity generation from coal using advanced clean
5 coal technology with carbon capture and geological
6 sequestration at a cost not greater than 10 percent
7 higher than the average of all commercial integrated
8 coal gasification and combined cycle electric gener-
9 ating plants operating in the United States as of the
10 date of enactment of this Act.

11 (c) COMMERCIALLY AVAILABLE ADVANCED CLEAN
12 COAL TECHNOLOGY.—To reduce technical risk and focus
13 development efforts on system integration, the Secretary
14 shall, to the extent practicable, ensure that the project uti-
15 lizes available advanced clean coal technology, such as coal
16 gasifier technology, for those components of the project
17 where such technology would be appropriate.

18 (d) AUTHORIZATION OF APPROPRIATIONS.—From
19 amounts authorized to be appropriated by section 401(a)
20 of the Energy Policy Act of 2005 (42 U.S.C. 15961(a)),
21 there are authorized to be appropriated to the Secretary
22 to carry out this section—

- 23 (1) \$54,000,000 for fiscal year 2007;
24 (2) \$100,000,000 for fiscal year 2008;
25 (3) \$113,000,000 for fiscal year 2009;

- 1 (4) \$81,000,000 for fiscal year 2010;
2 (5) \$62,000,000 for fiscal year 2011; and
3 (6) \$57,000,000 for fiscal year 2012.

4 **SEC. 4. ADVANCED FUEL CYCLE TECHNOLOGIES FOR NU-**
5 **CLEAR POWER.**

6 (a) IN GENERAL.—The Secretary shall carry out a
7 program of research, development, demonstration, and
8 commercial application for advanced nuclear fuel cycle
9 technologies for generating electricity and industrial proc-
10 ess heat from nuclear power, including technologies for
11 spent fuel recycling, waste minimization, and reduction of
12 radioactivity of final waste products.

13 (b) OBJECTIVES.—The Secretary shall design the
14 program under this section to develop technologies that
15 would—

16 (1) minimize the volume and heat load of high-
17 level nuclear waste destined for storage in a geologi-
18 cal repository to the extent that a single repository
19 would be sufficient for storing all nuclear waste gen-
20 erated by United States commercial nuclear power
21 plants during this century;

22 (2) increase the proliferation resistance of com-
23 mercial nuclear power reactors and their associated
24 fuel systems and infrastructure; and

1 (3) increase the amount of useful energy that
2 can be extracted from nuclear fuel.

3 (c) SYSTEMS ANALYSIS.—

4 (1) IN GENERAL.—The Secretary shall develop
5 a comprehensive modeling and simulation capability
6 to enable a thorough analysis of possible advanced
7 nuclear fuel cycle systems. The modeling and sim-
8 ulation capability shall be capable of examining—

9 (A) all of the components of each advanced
10 nuclear fuel cycle system analyzed, including—

11 (i) spent fuel separations technologies;

12 (ii) advanced burner reactor tech-
13 nologies;

14 (iii) fuel fabrication technologies;

15 (iv) advanced thermal reactor tech-
16 nologies, including advanced thermal reac-
17 tor designs that would be capable of reduc-
18 ing the toxicity or radioactivity of spent
19 nuclear fuel components; and

20 (v) waste disposal technologies;

21 (B) the manner in which possible tech-
22 nology and engineering choices for individual
23 components might affect the overall system,
24 and how various system components would
25 interact with one another; and

1 (C) quantitative mass flows of nuclear fuel
2 and spent nuclear fuel, including projected in-
3 ventories and transportation requirements for
4 nuclear fuel and spent nuclear fuel, for any ex-
5 amined system.

6 (2) ADVANCED NUCLEAR FUEL CYCLE SYSTEM
7 PLAN.—

8 (A) ANALYSIS.—The Secretary shall con-
9 duct a thorough analysis of more than one pos-
10 sible configuration of an advanced nuclear fuel
11 cycle system using the analytical capability de-
12 veloped under paragraph (1). Each possible ad-
13 vanced nuclear fuel cycle system configuration
14 examined shall include both advanced burner
15 reactors and advanced thermal reactors, and
16 the analysis shall consider the degree to which
17 each type of reactor can be utilized to reduce
18 the toxicity or radioactivity of spent nuclear
19 fuel components. The analysis of each possible
20 configuration of an advanced nuclear fuel cycle
21 system examined shall examine the compat-
22 ibility of fuel cycle system components, includ-
23 ing each of the system component technologies
24 described in paragraph (1)(A), and the degree

1 to which the examined system would meet the
2 objectives described in subsection (b).

3 (B) PLAN.—Using the results of the anal-
4 yses developed under subparagraph (A), and
5 not later than June 30, 2007, the Secretary
6 shall develop a detailed plan for research, devel-
7 opment, demonstration, and commercial appli-
8 cation on advanced nuclear fuel cycle system
9 technologies, including proposed technology op-
10 tions for each of the system component tech-
11 nologies described in paragraph (1)(A) and any
12 proposed engineering-scale demonstrations of
13 such system component technologies. The plan
14 shall include an estimate of the design, engi-
15 neering, construction and lifetime operating
16 costs of any proposed engineering-scale dem-
17 onstration. In developing the plan, the Sec-
18 retary shall consider the integration into an ad-
19 vanced nuclear fuel cycle system of advanced
20 thermal reactors capable of reducing the tox-
21 icity or radioactivity of spent nuclear fuel com-
22 ponents.

23 (C) CONSULTATION.—In developing the
24 plan under subparagraph (B), the Secretary
25 shall consult with—

1 (i) technical experts from United
2 States and foreign companies that design
3 or engineer nuclear power plants or nu-
4 clear fuel reprocessing facilities;

5 (ii) technical experts from United
6 States electric utilities that operate nuclear
7 power plants;

8 (iii) economists with expertise in nu-
9 clear power and electricity markets;

10 (iv) the Nuclear Energy Research Ad-
11 visory Committee;

12 (v) the Chairman of the Nuclear Reg-
13 ulatory Commission; and

14 (vi) the Administrator of the Environ-
15 mental Protection Agency.

16 (3) NATIONAL ACADEMY OF SCIENCES RE-
17 VIEW.—The Secretary shall enter into an arrange-
18 ment with the National Academy of Sciences to con-
19 duct a review of the plan developed under paragraph
20 (2)(B), including by reviewing the validity of the un-
21 derlying analyses required in paragraph (2)(A).

22 (d) REPORT.—Not later than June 30, 2008, the
23 Secretary shall transmit to Congress a report that includes
24 the research, development, demonstration, and commercial
25 application plan developed under subsection (c)(2)(B), the

1 report from the National Academy of Sciences on the re-
2 view conducted under subsection (c)(3), and the Sec-
3 retary's response to the findings and conclusions con-
4 tained in the National Academy of Sciences report.

5 (e) PROHIBITION.—The Secretary shall not initiate
6 detailed design or construction of any demonstration facil-
7 ity that is capable of processing 500 kilograms or more
8 per year of nuclear fuel or spent nuclear fuel and that
9 is designed to demonstrate the advanced nuclear fuel sys-
10 tem component technologies described in subsection
11 (c)(1)(A)(ii) and (iii) until 90 days after the report under
12 subsection (d) has been transmitted to Congress.

13 (f) AUTHORIZATION OF APPROPRIATIONS.—

14 (1) ALLOCATIONS.—From amounts authorized
15 to be appropriated under section 951(d)(1) of the
16 Energy Policy Act of 2005 (42 U.S.C. 16271(d)(1)),
17 there are authorized to be appropriated to the Sec-
18 retary to carry out this section such sums as may
19 be necessary for each of fiscal years 2007 through
20 2009.

21 (2) ADDITIONAL AMOUNTS.—There are author-
22 ized to be appropriated to the Secretary to carry out
23 this section such sums as may be necessary for each
24 of fiscal years 2010 through 2012.

1 **SEC. 5. ADVANCED BATTERY TECHNOLOGIES.**

2 (a) IN GENERAL.—The Secretary shall carry out a
3 program of research, development, demonstration, and
4 commercial application for advanced battery technologies
5 for use in motor vehicles, particularly for plug-in hybrid
6 motor vehicles.

7 (b) OBJECTIVE.—The Secretary shall design the pro-
8 gram under this section to develop technologies that would
9 enable a light-duty, plug-in hybrid motor vehicle to travel
10 up to 40 miles on battery power alone.

11 (c) AUTHORIZATION OF APPROPRIATIONS.—There
12 are authorized to be appropriated to the Secretary to carry
13 out this section—

- 14 (1) \$31,000,000 for fiscal year 2007;
15 (2) \$34,100,000 for fiscal year 2008;
16 (3) \$37,500,000 for fiscal year 2009; and
17 (4) \$41,250,000 for fiscal year 2010.

18 **SEC. 6. ADVANCED BIOFUEL TECHNOLOGIES.**

19 (a) IN GENERAL.—The Secretary shall carry out a
20 program of research, development, demonstration, and
21 commercial application for production of liquid fuels from
22 biomass.

23 (b) OBJECTIVES.—The Secretary shall design the
24 program under this section to—

1 (1) develop technologies that would make eth-
2 anol produced from cellulosic feedstocks cost com-
3 petitive with ethanol produced from corn by 2012;

4 (2) conduct research and development on how
5 to apply advanced genetic engineering and bio-
6 engineering techniques to increase the efficiency and
7 lower the cost of industrial-scale production of liquid
8 fuels from cellulosic feedstocks; and

9 (3) conduct research and development on the
10 production of hydrocarbons other than ethanol from
11 biomass.

12 (c) AUTHORIZATION OF APPROPRIATIONS.—From
13 amounts authorized to be appropriated under section
14 931(c) of the Energy Policy Act of 2005 (42 U.S.C.
15 16231(c)), there are authorized to be appropriated to the
16 Secretary to carry out this section—

17 (1) \$150,000,000 for fiscal year 2007;

18 (2) \$160,000,000 for fiscal year 2008; and

19 (3) \$175,000,000 for fiscal year 2009.

20 **SEC. 7. ADVANCED HYDROGEN STORAGE TECHNOLOGIES.**

21 (a) IN GENERAL.—The Secretary shall carry out a
22 program of research, development, demonstration, and
23 commercial application for technologies to enable practical
24 onboard storage of hydrogen for use as a fuel for light-
25 duty motor vehicles.

1 (b) OBJECTIVE.—The Secretary shall design the pro-
2 gram under this section to develop practical hydrogen
3 storage technologies that would enable a hydrogen-fueled
4 light-duty motor vehicle to travel 300 miles before refuel-
5 ing.

6 (c) AUTHORIZATION OF APPROPRIATIONS.—In addi-
7 tion to amounts otherwise authorized to be appropriated,
8 there are authorized to be appropriated to the Secretary
9 to carry out this section—

- 10 (1) \$46,000,000 for fiscal year 2007;
11 (2) \$50,000,000 for fiscal year 2008;
12 (3) \$55,000,000 for fiscal year 2009; and
13 (4) \$60,000,000 for fiscal year 2010.

14 **SEC. 8. ADVANCED SOLAR PHOTOVOLTAIC TECHNOLOGIES.**

15 (a) IN GENERAL.—The Secretary shall carry out a
16 program of research, development, demonstration, and
17 commercial application for advanced solar photovoltaic
18 technologies.

19 (b) OBJECTIVES.—The Secretary shall design the
20 program under this section to develop technologies that
21 would—

- 22 (1) make electricity generated by solar photo-
23 voltaic power cost-competitive by 2015; and
24 (2) enable the widespread use of solar photo-
25 voltaic power.

1 (c) AUTHORIZATION OF APPROPRIATIONS.—There
 2 are authorized to be appropriated to the Secretary to carry
 3 out this section—

- 4 (1) \$148,000,000 for fiscal year 2007;
- 5 (2) \$155,000,000 for fiscal year 2008;
- 6 (3) \$165,000,000 for fiscal year 2009; and
- 7 (4) \$180,000,000 for fiscal year 2010.

8 **SEC. 9. ADVANCED WIND ENERGY TECHNOLOGIES.**

9 (a) IN GENERAL.—The Secretary shall carry out a
 10 program of research, development, demonstration, and
 11 commercial application for advanced wind energy tech-
 12 nologies.

13 (b) OBJECTIVES.—The Secretary shall design the
 14 program under this section to—

- 15 (1) improve the efficiency and lower the cost of
- 16 wind turbines;
- 17 (2) minimize adverse environmental impacts;
- 18 and
- 19 (3) develop new small-scale wind energy tech-
- 20 nologies for use in low wind speed environments.

21 (c) AUTHORIZATION OF APPROPRIATIONS.—There
 22 are authorized to be appropriated to the Secretary to carry
 23 out this section—

- 24 (1) \$44,000,000 for fiscal year 2007;
- 25 (2) \$48,400,000 for fiscal year 2008;

- 1 (3) \$53,240,000 for fiscal year 2009; and
- 2 (4) \$58,564,000 for fiscal year 2010.

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